REMARKS

Introduction And Interview Summary

Applicants and their attorney thank Examiner Palabrica for the Interview on April 1, 2010. For the Examiner's convenience the text of his interview summary is set forth below.

> 1. Applicant's representative presented proposed amendments to the claims that include additional structural limitations inherent to the claimed device. Based on the examiner's preliminary evaluation, it appears that these amendments would define over the applied art. However, the examiner indicated that he will review the amended claims when formally submitted, and would perform further search of prior art. The examiner also emphasized that the applicant ensure the amendments are still directed to the elected invention and that no new matter is introduced.
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> 2. The examiner also suggested possible approaches to overcoming the 112 rejections to the claims.
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> 3. The examiner indicated that he intends to enter the proposed amendments for further examination.

Later, the Examiner expressly withdrew the finality of his last office action.[1] The Applicants greatly appreciate this action. The Examiner indicated that if the claims described the central axes of the inlet conduit and output conduits intersect at 25° or less and which angles were described as effecting turbulence were features not shown in the art. These angles would be generally shown in Figure 7 (set forth below)

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[1] At the interview applicants' attorney referred the Examiner to MPEP § 706.07 which states:

> "It would not be proper to make final first Office action immediately after the filing of an RCE if the first Office action includes a new ground of rejection. See MPEP § 1207.03."

There was a new grounds with new art in the last office action. Applicants truly appreciate the withdrawal of the final rejection.

if lines of the central axes of the inlet (4) and outlets (5 and 6 where these channels angle inwardly to the cavity 8) were generally extended to intersect.

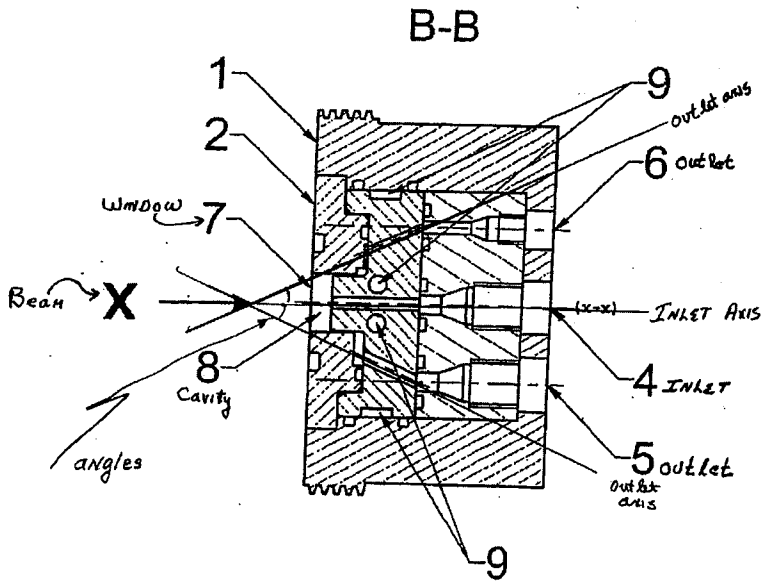

Fig.7

The Current Claims

With this amendment, claims 1-6, 11-12, 14, 21-25, 30-40 are pending. Claims 1-23 are the independent claims. Claims 39 and 40 are new.

The Rejections

1. The 112 Rejection

The Examiner rejected claims 1-6, 11, 12, 14, 21, 22 and 32-37 based upon section 112 second paragraph as being indefinite. As amended the claims claim an entire device which produces a radioisotope from a target fluid irradiated with with a beam of accelerated charged particles where the device includes a **circulation circuit** as set for the in the claims, e.g. the circulation circuit including an irradiation cell which includes a metallic insert (described in some detail); a pump; heat exchanger; and pressurizing device. As discussed at the interview, the whole device is claimed with

the "circulation circuit comprising." With the amendments herein, it is believed all section 112 problems have been solved. If not, the Examiner is invited to call the applicants' attorney for further potential modification of the claims.

2. The Only Art Rejection Is An Obviousness Rejection

The Examiner rejected claims 1-6, 21-25 and 32-37 as obvious based upon Kilbourn et al, Link et al., and Lindner et al.

As discussed at the interview, the Examiner's problems with the previously pending claims were based upon some of the functional language in the claims did not sufficiently provide the structure that in the Examiner's view permitted him to see that the claims distinguished the prior art. In the Examiner's view, while the art cited and applied by the Examiner does not show structure except to show target which would be exposed to some beam with one inlet conduit and one outlet conduit, the claims did not distinguish that prior art structure. As discussed at the interview, applicants' proposed amendments as reflected in the claims in this amendment, distinguish the art previously cited and applied.

The References

1. Kilbourn

Figure 1 of Kilbourn (as shown below for the Examiner's convenience) shows target water being fed into a target water cavity through lines which are perpendicular to the cavity. The Examiner at page 7 (at the second full paragraph), appears to acknowledge this geometry for Kilbourn's input and output of target water.

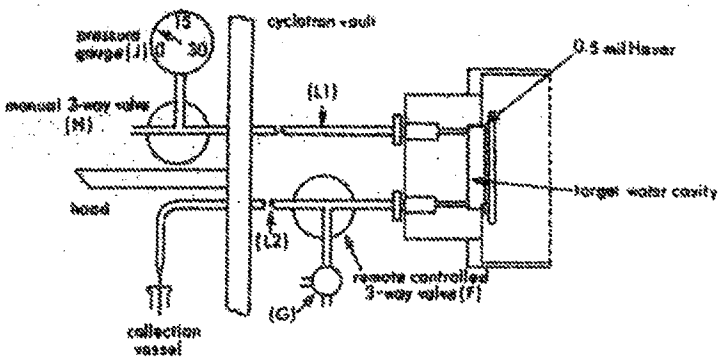

Fig. 1

2. Link

Link describes irradiation of target water and Figure 2 of Link (as shown below for the Examiner's convenience) seems to show the ion beam perpendicularly directed to a window in front of a cavity (a "flow through chamber") housing the target water. Inlet and outlet lines are basically parallel to the ion beam and appear to be perpendicular to the window through which the ion beam flows.

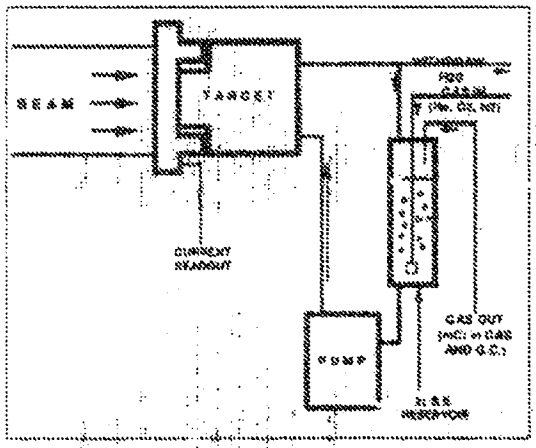

Figure 2: Water Target System for Protons

The Art Does Not Show A Geometry, A Inlet And Two Outlets Which Create The Vortex

1. The Problem And Why The Vortex Is Important - To Dissipate Heat And Pressure So That At Least The Irradiation Window Will Not Be Damaged

To handle increasing demands for the production of radioisotopes such as ^{18}F, increases in beam power have been used for irradiation. The increase in power has caused a need for dissipation of heat and pressure. This has been difficult when working with small volumes. See paragraphs 0009 to 0018 of the instant published application. Applicants' solution is to create turbulence in the cavity in which the target fluid is being irradiated which when coupled with other cooling efforts will act to efficiently reduce temperatures in the irradiation cavity.

Applicants' apparatus and method are illustrated in Figure 7 of the instant application set forth above.

The specification explains how the angles between the inlet conduit and outlet conduits create the vortex as follows.

> [0050] The present invention is also related to an irradiation cell comprising a metallic insert, able to form a cavity designed to house a target fluid and comprising at least one inlet and at least one outlet, said cavity being defined by a central axis around which a lateral surface is developed, and said cavity being closed by an irradiation window and being closed by a second surface essentially perpendicular to the central axis and opposed to the irradiation window, said irradiation cell being characterized in that the inlet is connected to said second surface essentially perpendicular to said central axis, while the outlet is connected to the lateral surface.
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> * * * *
>
> [0072] The irradiation cell also comprises an inlet 4 and an outlet 5 allowing the target material to enter the irradiation cell and get out of it. The inlet and outlet provide the inflow and outflow of the target material or vice versa, depending on the direction of circulation within the circuit.

[0073] What is important in the present invention is to generate a flow vortex which is essentially turbulent within said cavity. In other words, in said invention, it is meant by "flow vortex" a hollow whirl which is generated in certain conditions in a flowing fluid.

[0074] For this purpose, according to the embodiment shown in FIG. 2 to 4, a first duct which is either the inlet duct or the outlet duct, is located essentially tangentially to said cavity. It is meant by "essentially tangentially" the fact that the first duct, which is the inlet duct, makes an angle of lower than 25°, and preferably lower than 15°, relatively to said physical tangent at its junction point with the cavity.

* * * *

[0076] According to this embodiment, the inlet duct 4 and outlet ducts 5 and 6 are all located at the periphery of the irradiation cell, and more precisely along a "meridian." This means that at least the ducts 4 and 5 are arranged side by side along an imaginary meridian and and therefore do not lie in the same transverse plane. Similarly, there is a difference between the inclination angle of the first duct at the junction point with the cavity and the inclination angle of the second duct at the junction point with said cavity. This configuration allows to create (sic) a flow vortex which prevents the generation of stagnation areas inside said cavity.

2. The New Claims Describe A Structure And Geometry Which Distinguish The Prior Art

The new claims describe the inlet conduits directing the liquid target fluids in a way which hit the beam "head on" and which puts the liquid as perpendicular to the window and the outlets at angles from the inlet which create the vortex. This is generally shown in Figure 7 above and is clearly not shown in the prior art.

Support For The New Claims

Figure 7 of the instant application shows different cross sections for the two outlets.

Conclusion

In view of the amendments made herein and the discussion at the interview, applicants respectfully request that the amendment herein be entered, the claims herein be reconsidered and allowed to pass to issue.

The Commissioner is hereby authorized to charge any additional fees which may be required with respect to this communication, or credit any overpayment, to Deposit Account No. 06-1135.

Respectfully submitted,

FITCH, EVEN, TABIN & FLANNERY

Dated: May 13, 2010 By: _____

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